

Low Power Low Offset Voltage Quad Comparators**Features**

- Wide Supply Voltage Range:
 - Single Supply: 2.0V to 36V
 - Dual Supplies: $\pm 1.0\text{V}$ to $\pm 18\text{V}$
- Low Supply Current Drain: 0.9mA
- Low Input Bias Current: 25nA (Typical)
- Low Input Offset Current: $\pm 5.0\text{nA}$ (Typical)
- Low Input Offset Voltage: 2.0mV (Typical)
- Input Common Mode Voltage Range
 - Includes Ground
- Differential Input Voltage Range Equals to the Power Supply Voltage
- Low Output Saturation Voltage: 200mV at 4mA
- Open Collector Output
- Available in Green SOIC-14(SOP-14) and TSSOP-14 Package

Applications

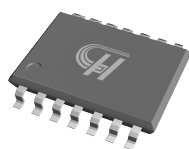
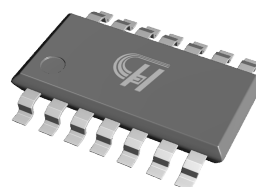
- Battery Charger
- Cordless Telephone
- Switching Power Supply
- DC-DC Module
- PC Motherboard
- Communication Equipment

General Description

The HCRM339/339A consist of four independent precision voltage comparators with a typical offset voltage of 2.0mV and high gain. They are specifically designed to operate from a single power supply over wide range of voltage. Operation from split power supply is also possible and the low power supply current drain is independent of the megnitude of the power supply voltage.

The HCRM339/339A series are compatible with industry standard 339. The HCRM339A has more stringent input offset voltage than the HCRM339.

The HCRM339 is available in SOIC14(SOP-14) and TSSOP-14 package, and the HCRM339A is available in SOIC-14(SOP-14) package.

**TSSOP-14****SOIC-14****Figure 1. Package Type of HCRM339/339A**

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Pin Configuration

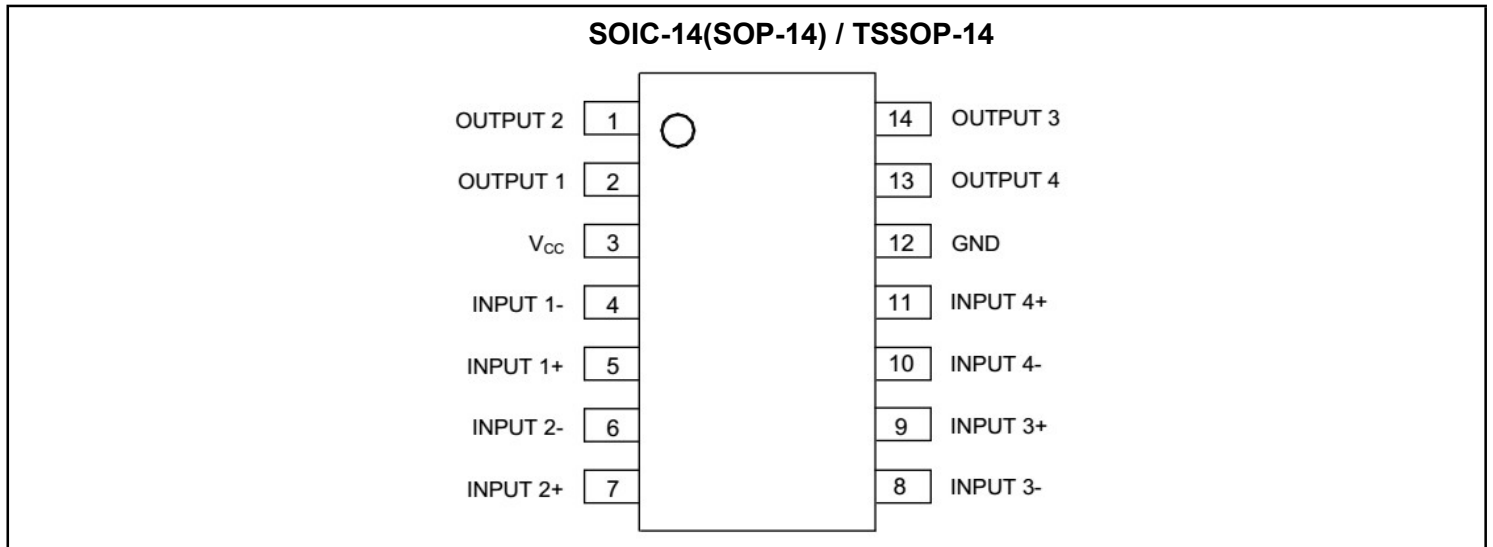
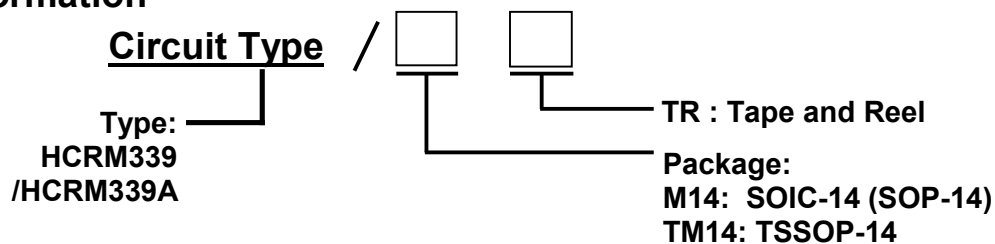


Figure 2. Pin Configuration of HCRM339/339A (Top View)

Pin Function Table

SOIC-14 (SOP-14)	TSSOP-14	Name	Function
1,2,13,14	1,2,13,14	Output 1/Output 2 Output 3/Output 4	Outputs
12	12	GND	Negative Power Supply
5,7,9,11	5,7,9,11	Input 1+/Input 2+ /Input 3+/Input 4+	Non-inverting Inputs
4,6,8,10	4,6,8,10	Input 1-/Input 2- /Input 3-/Input 4-	Inverting Inputs
3	3	+Vcc	Positive Power Supply

Ordering Information



Ordering Code ^{note b}

Part Number	Marking ID	Temperature Range	Package	Package Type
HCRM339/M14TR	M339XX	-40'C to +85'C	SOIC-14 (SOP-14)	2500pcs/TR
HCRM339/TM14TR	M339XX	-40'C to +85'C	TSSOP-14	2500pcs/TR
HCRM339A/M14TR	M339AXX	-40'C to +85'C	SOIC-14 (SOP-14)	2500pcs/TR

note a. marking information: XX, the 1ST X is date code-Year(A=2010, B=2011,...)

the 2nd X is date code-month(A=Jan, B=Feb,...L=Dec). for example: S5BBA (2011,January)

Low Power Low Offset Voltage Quad Comparators**Absolute Maximum Ratings** Note 1

Parameter		Symbol	Value	Unit
Supply Voltage		V _{CC}	40	V
Input Voltage		V _{IN}	-0.3 to 40	V
Difference Input Voltage		V _{ID}	40	V
Input Current (V _{IN} <-0.3V)		I _{IN}	50	mA
Output Short-Circuit to Ground		-	Continuous	-
Power Dissipation @T _A =+25°C	SOIC-14 (SOP-14)	P _D	890	mW
	TSSOP-14		790	
Storage Temperature Range		T _{STG}	-65 to 150	°C
Operating Junction Temperature		T _J	+150	°C
Lead Temperature (Soldering, 10s)		T _{LEAD}	+260	°C

Note 1: Stresses above those listed under "Maximum Ratings" may cause permanent damage to the device.

This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{CC}	2	36	V
Operating Temperature Range	V _{IN}	-40	+85	°C

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Electrical Characteristics:

(Limits in standard typeface are for TA=25 °C, bold typeface applies over TA=-40°C to +85°C^{note2} VCC=5V, GND=0V, unless otherwise noted.)

Parameter	Symbol	Conditions		Min	Type	Max	Unit
Input Offset Voltage	V _{OS}	HCRM339	V _O =1.4V, R _S =0Ω, V _{CC} from 5V to 30V	-	2	5	mV
				-	-	7	
		HCRM339A		-	2	3	
				-	-	5	
Input Bias Current	I _{BC}	I _{IN+} or I _{IN-} with output in linear Range, V _{CM} =0V		-	25	250	nA
				-	-	400	
Input Offset Current	I _{OC}	I _{IN+} - I _{IN-} , V _{CM} = 0V		-	5.0	50	nA
				-	-	200	
Input Common Mode Voltage Range ^{note3}	V _{CM}	V _{CC} =30V		0	-	V _{CC} -1.5	V
Supply Current	I _O	V _{CC} =5V	R _L = ∞	-	0.9	2.0	mA
				-	-	3.0	
		V _{CC} =30V		-	1.2	2.5	
				-	-	3.5	
Voltage Gain	A _{VO}	R _L ≥15KΩ, V _{CC} =15V, V _O =1V to 11V		50	200	-	V/mV
Large Signal Response Time	T _r	V _{IN} =TTL Logic Swing, V _{REF} =1.4V, V _R L=5V, R _L =5.1KΩ		-	200	-	ns
Response Time	T _{RS}	V _R L=5V, R _L =5.1KΩ		-	1.3	-	us
Output Sink Current	I _{SC}	V _{IN-} =1V, V _{IN+} =0, V _O =1.5V		6.0	16	-	mA
Output Leakage Current	I _{Leakage}	V _{IN-} =0V, V _{IN+} =1V, V _O =5V		-	0.1	-	nA
		V _{IN-} =0V, V _{IN+} =1V, V _O =30V		-	-	1.0	uA
Saturation Voltage	V _S	V _{IN-} =1V, V _{IN+} =0, I _{SINK} ≤4mA		-	200	400	mV
				-	-	500	
Thermal Resistance (Junction to Case)	θ _{JC}	SOIC-14(SOP-14)		-	15	-	'C/W
		TSSOP-14		-	6	-	
Thermal Resistance (Junction to Ambient)	θ _{JA}	SOIC-14(SOP-14)		-	89	-	'C/W
		TSSOP-14		-	125	-	

note 2. Limites over the full temperature are guaranteed by design, but not tested in production.

3. The input common-mode voltage of either input signal should not be allowed to go negatively by more than 0.3V (at +25°C). The upper end of the common-mode voltage range is V_{CC}-1.5V (at +25°C), but either or both inputs can go to +36V without damages, independent of the magnitude of the V_{CC}.

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Typical Performance Characteristics (Unless Otherwise Specified.)

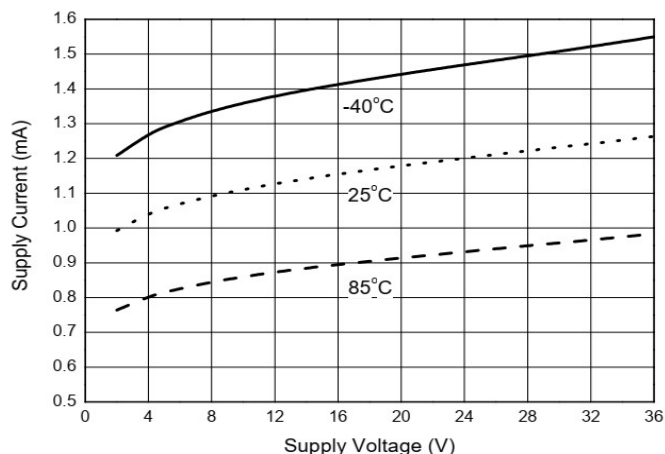


Figure 3. Supply Voltage vs. Supply Current

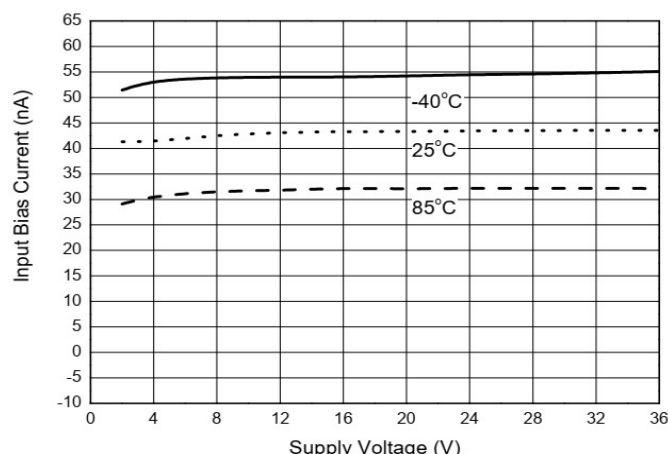


Figure 4. Supply Voltage vs. Input Bias Current

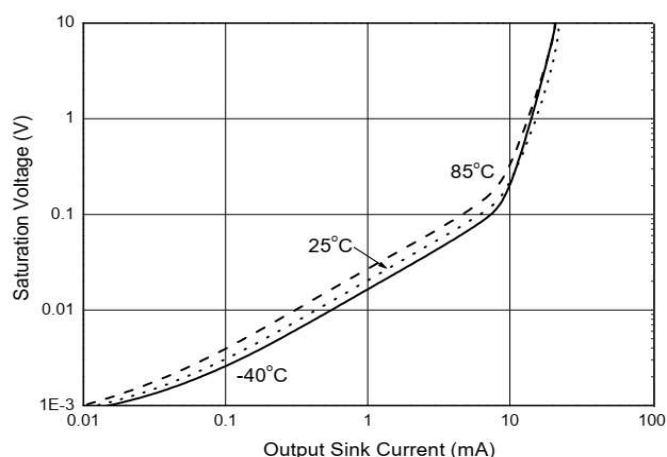


Figure 5. Output Sink Current vs. Saturation Voltage

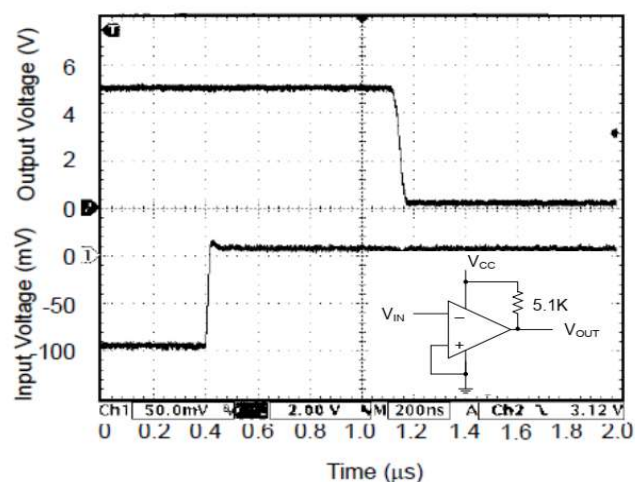


Figure 6. Response Time for 5mV Input Overdrive - Negative Transition

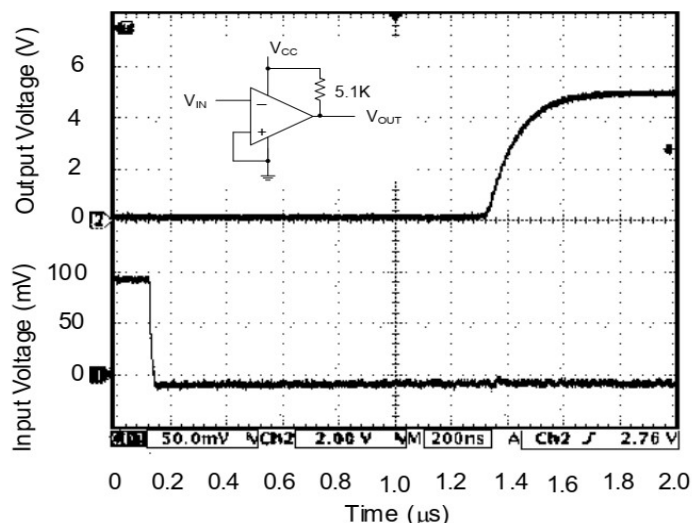


Figure 7. Response Time for 5mV Input Overdrive - Positive Transition

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Functional Block Diagram

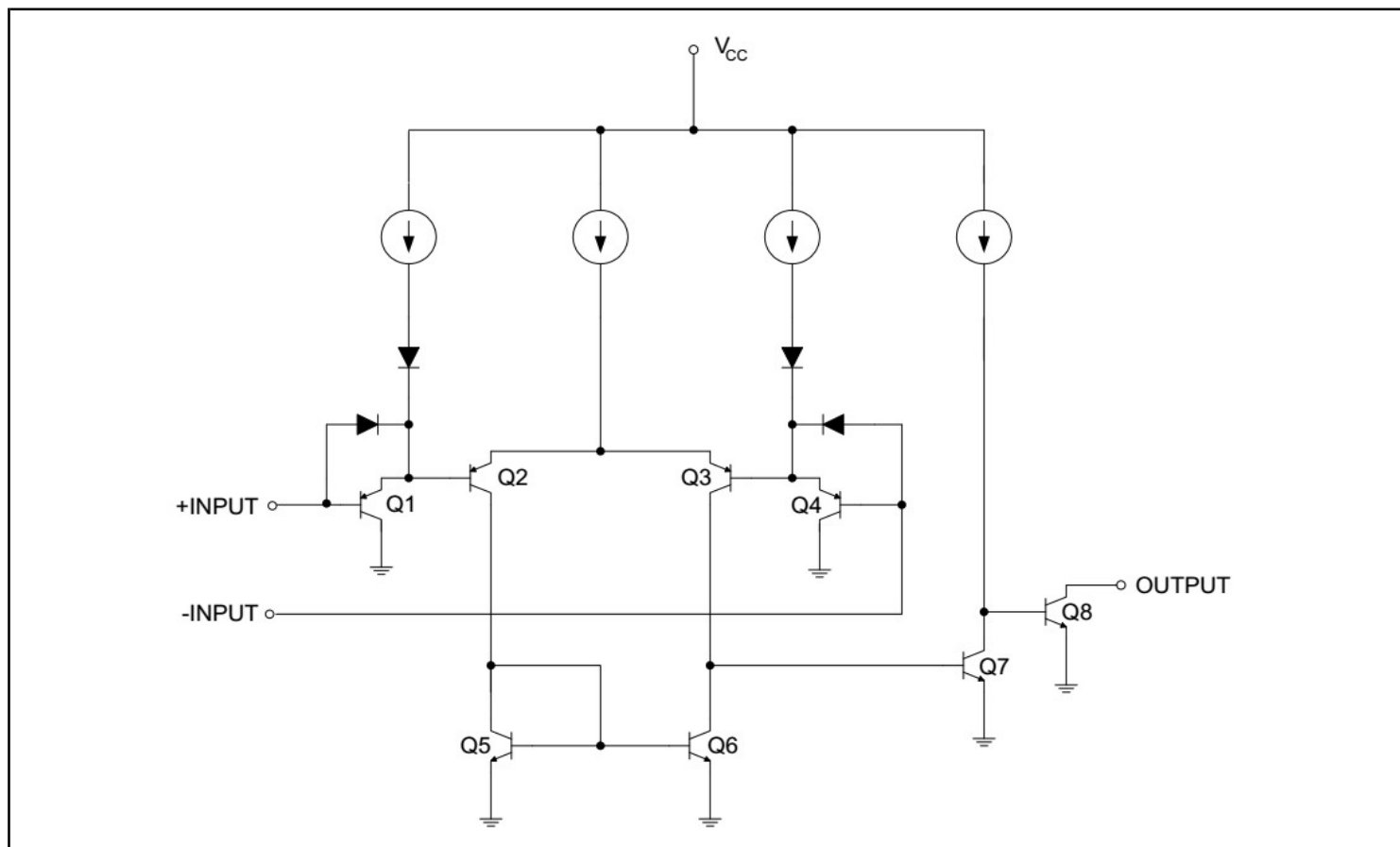


Figure 8. Functional Block Diagram of HCRM339/339A

Typical Application Circuit

- Driving CMOS & Basic Comparator

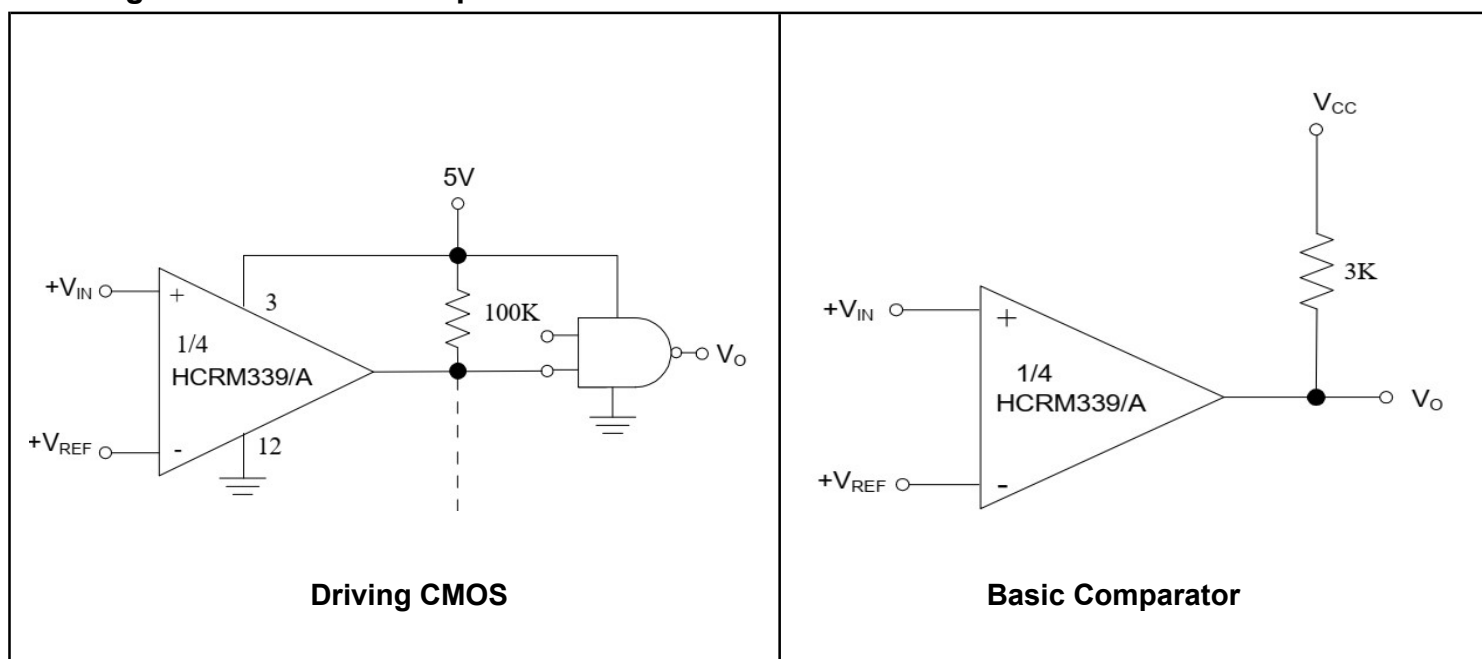


Figure 9. Driving CMOS & Basic Comparator of HCRM339/339A

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Typical Application Circuit(Con.)

- One Shot Multivibrator

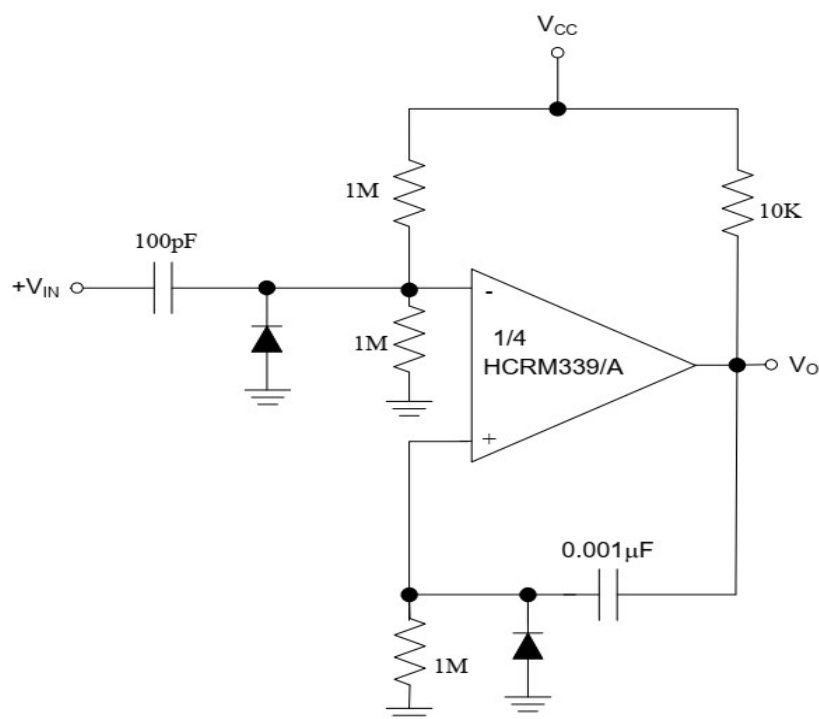


Figure 10. One Shot Multivibrator

- Squarewave Oscillator

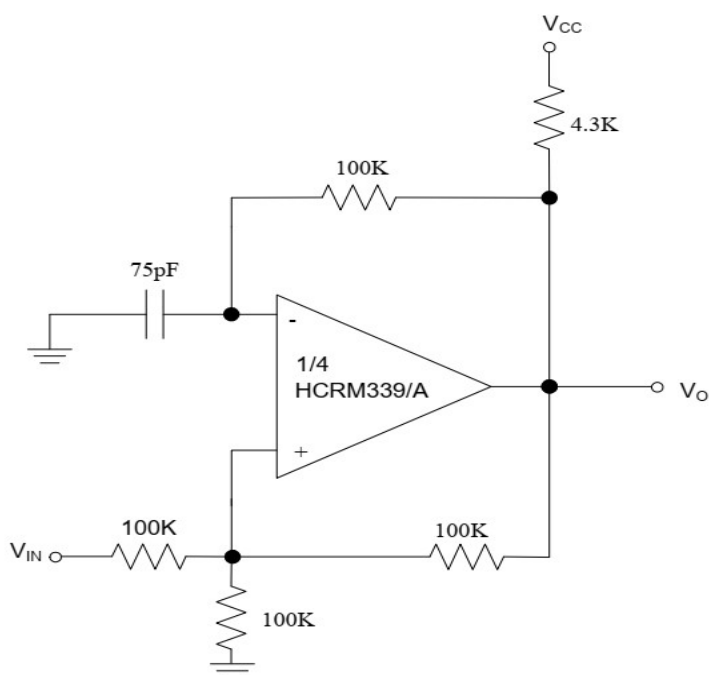


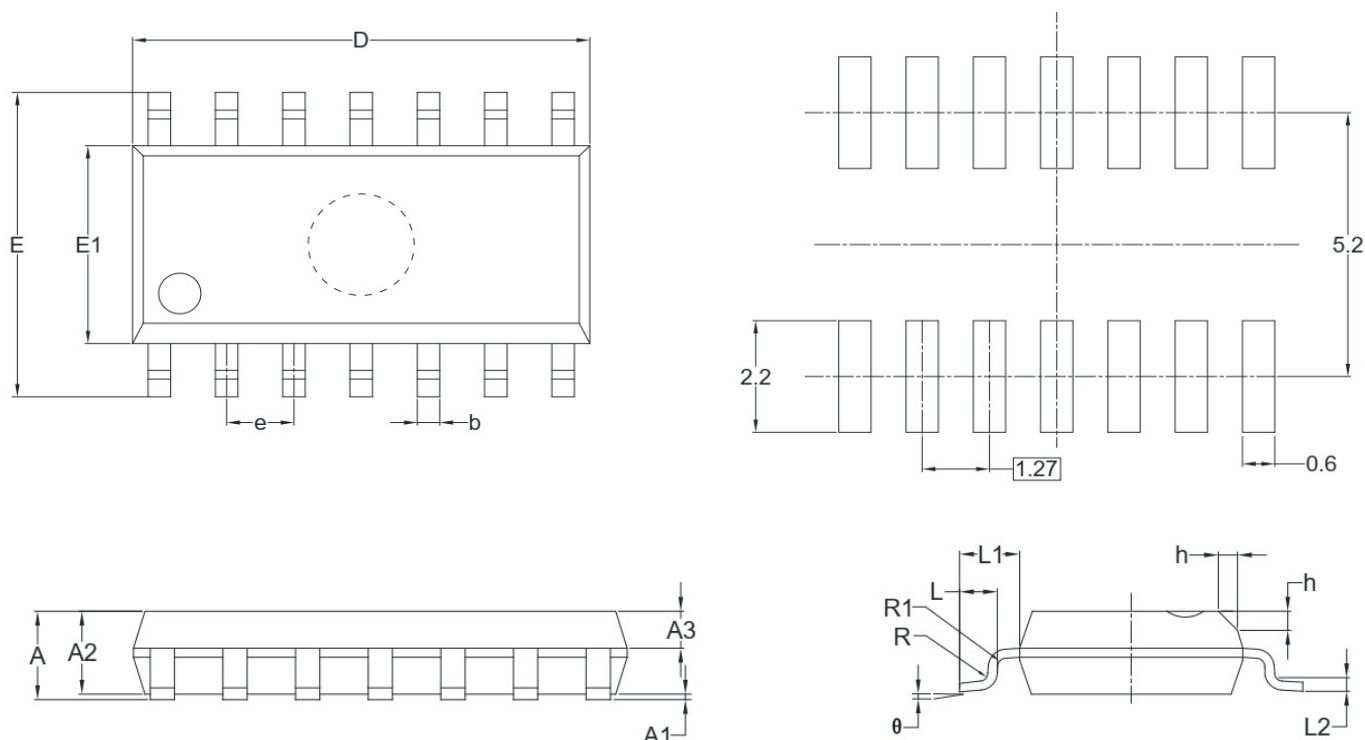
Figure 11. Squarewave Oscillator

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Mechanical Dimensions

PKG: SOIC-14(SOP-14) (M14)

Unit: mm (inch)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	1.65	0.049	0.065
A3	0.55	0.75	0.022	0.030
b	0.36	0.49	0.014	0.019
D	8.53	8.73	0.336	0.344
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.45	0.80	0.018	0.032
L1	1.04 REF		0.040 REF	
L2	0.25 BSC		0.01 BSC	
R	0.07		0.003	
R1	0.07		0.003	
h	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

NOTES:

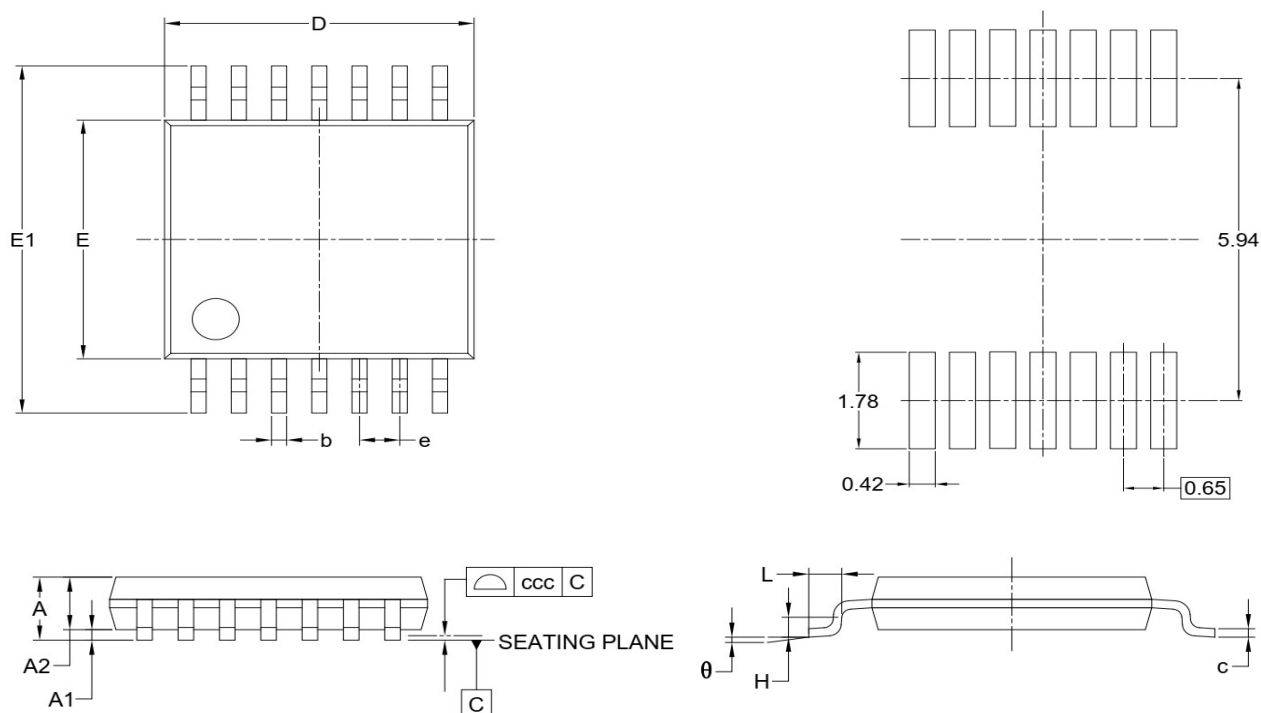
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

Low Power Low Offset Voltage Quad Comparators

Mechanical Dimensions(Con.)

PKG: TSSOP-14 (TM14)

Unit: mm (inch)



Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	-	-	1.200
A1	0.050	-	0.150
A2	0.800	-	1.050
b	0.190	-	0.300
c	0.090	-	0.200
D	4.860	-	5.100
E	4.300	-	4.500
E1	6.200	-	6.600
e	0.650 BSC		
L	0.450	-	0.750
H	0.250 TYP		
θ	0°	-	8°
ccc	0.100		

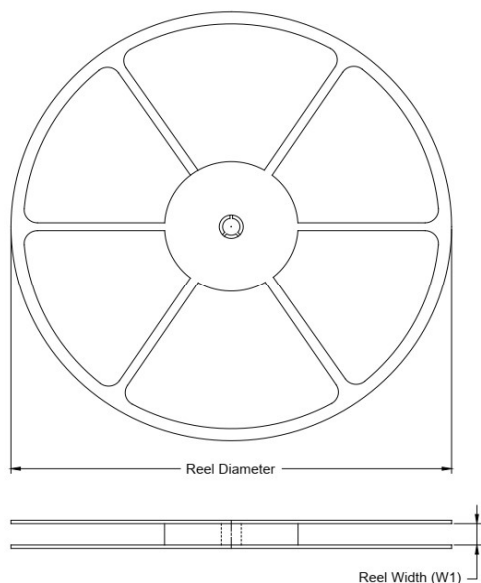
NOTES:

1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-153.

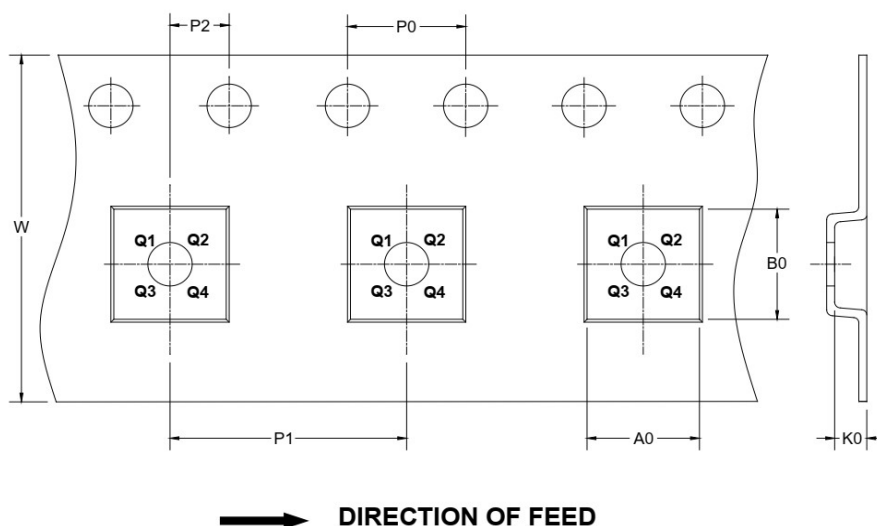
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TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



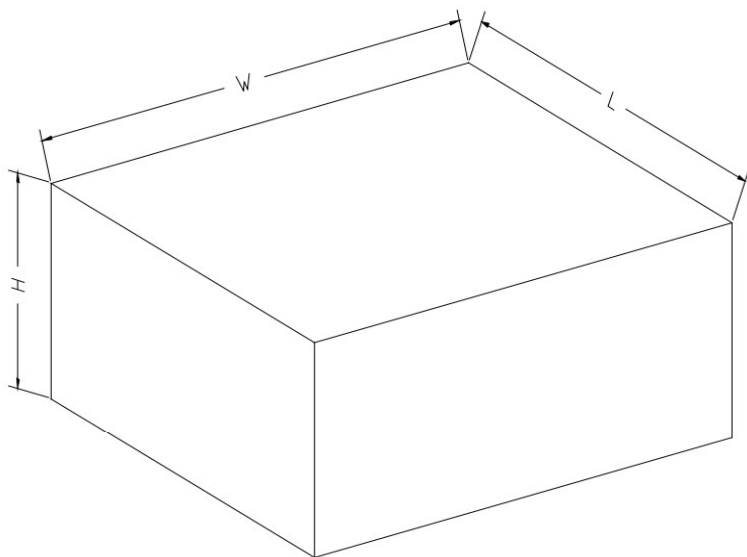
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOIC-14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
TSSOP-14	13"	12.4	6.80	5.40	1.50	4.0	8.0	2.0	12.0	Q1

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CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13"	386	280	370	5

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Statements And Notes

The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	o	o	o	o	o	o	o	o	o	o
Plastic resin	o	o	o	o	o	o	o	o	o	o
Chip	o	o	o	o	o	o	o	o	o	o
The lead	o	o	o	o	o	o	o	o	o	o
Plastic sheet installed	o	o	o	o	o	o	o	o	o	o
explanation	o: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. X: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

Notion

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